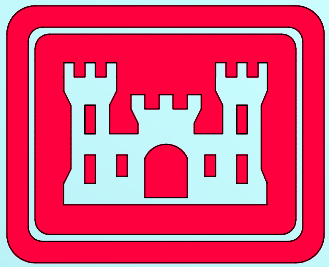
Technical Project Planning Meeting
Boardman Air Force Range

Public Meeting

Site Inspections at Multiple Sites, NWO Region
Formerly Used Defense Sites, Military Munitions Response Program



Shaw® Shaw Environmental, Inc.

July 20, 2006

Agenda:

- Introductions
  - Who's involved ?
  - What is FUDS ? What's the purpose?
- Project Objectives
  - Goals, Objectives, Roles & Responsibilities
  - Site Inspection Process
  - Technical Project Planning (TPP) Process
- Discuss Issues the Site
  - Site Investigation Work
  - Site Inspection Impact to land
  - Schedule
- Site Access
  - Access Agreements
- Landowners/Leaseholders Input
  - Land access or other concerns
  - Background information on site use
- Summary

Background

- For decades, Department of Defense (DoD) has used military munitions in training and testing to achieve force readiness
- When ranges are put to another use, it is necessary to protect human health and the environment from potential hazards

What Could Be There?

- Munitions and Explosives of Concern (MEC)
  - Unexploded Ordnance (UXO)
  - Discarded Military Munitions
  - Explosive Munitions Constituents
- Munitions Constituents (MC)

Why Now?

- In 2002 (National Defense Authorization Act), Congress required DoD to:
  - Create an inventory of defense sites known or suspected of containing munitions or munitions constituents
  - Prioritize sites needing action
  - Give Congress a response plan

DoD's Response

- Military Munitions Response Program
- DoD has identified over 3,300 sites
- Active installations (1,333)
- Base Realignment & Closure (318)
- Formerly Used Defense Sites—FUDS (1,658)
- Site Inspections to be completed by 2010

FUDS Site Inspections

- U.S. Army Corps of Engineers (USACE)
- Shaw Environmental, Inc.
- Oregon Department of Environmental Quality
- U.S. Environmental Protection Agency
- Stakeholders--Land owners, residents, public

Goal:

Conduct Site Inspections (**SI**) of Formerly Used Defense Sites (**FUDS**) sites to determine if any munitions and explosives of concern (**MEC**) or related munitions constituents (**MC**) are present on property formerly owned or leased by the U.S. Department of Defense (**DoD**).

Site Inspection (SI) Goal

- Are munitions or munitions constituents present?

Possible Outcomes of SI

- Eliminate a site from further action
- Determine need to investigate further
  - Remedial Investigation (RI)
  - Feasibility Study (FS)
- Determine need for a time-critical removal action

Yardsticks

- SI provides information needed for
  - EPA's Hazard Ranking System for National Priorities List (Superfund) sites
  - DoD's new Munitions Response Site Prioritization Protocol

FUDS

(What is it ?)

Formerly **U**sed **D**efense **S**ites

- Property which was previously owned or leased by the U.S Department of Defense
- Oregon sites used during WWII and Korean Conflict
- 4 sites currently funded

Camp Adair – near Corvallis

Camp Abbot – at Sunriver

Boardman Air Force Range

Central Oregon Gunnery Range – near Lakeview

Roles & Responsibilities:

- **USACE:** Manages the DoD FUDS program; ensures that the work is conducted in accordance with applicable federal and USACE regulations; and coordinates with stakeholders.

- **Regulatory Agency:** Oregon Department of Environmental Quality & US Environmental Protection Agency:
  - Participates in planning of SI activities in order to meet applicable requirements and stakeholders expectations.

- **Property Owner(s)**: Provides available and pertinent information about the area; identifies current and anticipated future land uses for the property, and participates in project team discussions.

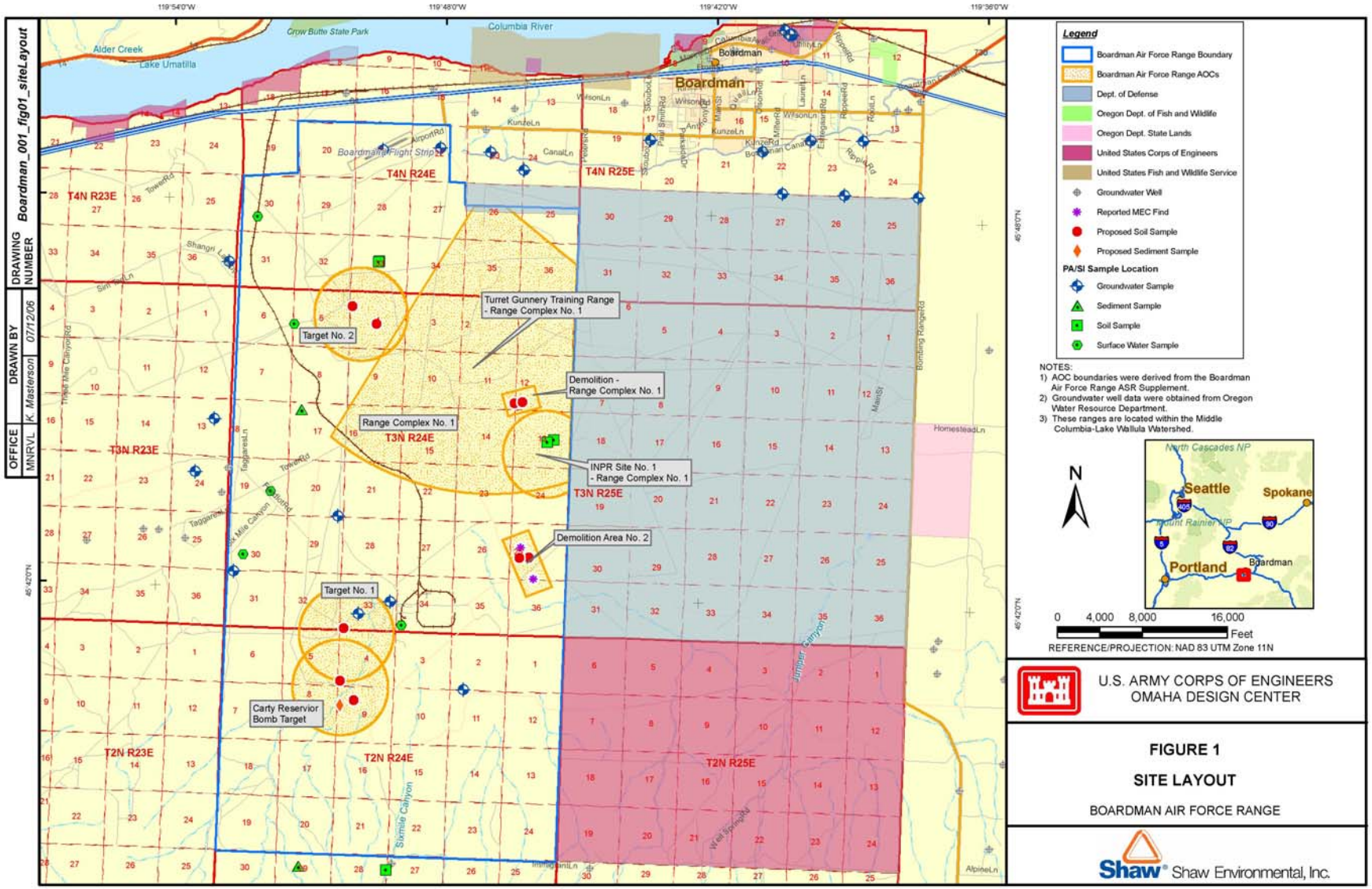
- **Shaw**: A contractor to the USACE, Shaw conducts work on behalf of the USACE, provides TPP materials, makes site information available to the project team through a web-based information portal, and conducts and reports site inspection activities.

Boardman Air Force Range

- Originally 95,985 acres site near Boardman, OR
- DoD from Feb 1942 to 1947
- 1960 Air Force declared property excess and property transferred to Navy, DOI, USACE. (checkerboard pattern)
- 1963 split into 2 parcels – east to Navy and west to OR
- OR has since sold parcels to private parties, Portland General Electric, and Morrow County

Boardman Air Force Range

- Range Uses:
  - Practice bombing range
    - 4 target areas
  - 2 Demolition areas
  - Practice Turret Gunnery Range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119°48'0"W
119°42'0"W
119°36'0"W
45°48'0"N
45°42'0"N
Columbia River
Crow Butte State Park
Alder Creek
Lake Umatilla
Boardman
Boardman Flight Strip
T4N R23E
T4N R24E
T4N R25E
T3N R23E
T3N R24E
T3N R25E
T2N R23E
T2N R24E
T2N R25E
Turret Gunnery Training Range - Range Complex No. 1
Target No. 2
Demolition - Range Complex No. 1
Range Complex No. 1
INPR Site No. 1 - Range Complex No. 1
Demolition Area No. 2
Target No. 1
Carty Reservior Bomb Target
Legend
Boardman Air Force Range Boundary
Boardman Air Force Range AOCs
Dept. of Defense
Oregon Dept. of Fish and Wildlife
Oregon Dept. State Lands
United States Corps of Engineers
United States Fish and Wildlife Service
Groundwater Well
Reported MEC Find
Proposed Soil Sample
Proposed Sediment Sample
PA/SI Sample Location
Groundwater Sample
Sediment Sample
Soil Sample
Surface Water Sample
NOTES:
1) AOC boundaries were derived from the Boardman Air Force Range ASR Supplement.
2) Groundwater well data were obtained from Oregon Water Resource Department.
3) These ranges are located within the Middle Columbia-Lake Wallula Watershed.
N
North Cascades NP
Seattle
Spokane
Mount Rainier NP
Portland
Boardman
0 4,000 8,000 16,000
Feet
REFERENCE/PROJECTION: NAD 83 UTM Zone 11N
U.S. ARMY CORPS OF ENGINEERS
OMAHA DESIGN CENTER
FIGURE 1
SITE LAYOUT
BOARDMAN AIR FORCE RANGE
Shaw Environmental, Inc.

Boardman Air Force Range

- Previous Investigations
  - INPR in 1992
  - ASR in 1997
  - ASR Supplement in 2004
  - PA/SI by USEPA in 2004
    - Sampled soil, sediment, surface water, and groundwater.
    - Demonstrated perchlorate in groundwater and surface water

Boardman AFR

- Military Use:
  - Air-to-Ground Practice Bombing
  - Turret Gunnery Training Range
  - Munitions Disposal
- MEC/MC Characteristics
  - Practice Bombs AN-Mk 5, Mk 23, Mk 43, AN-M50, M38A2, M75, M89, BDU-10 (w/ spotting charges)
  - 2.25-inch rockets
  - Small arms 20 mm
  - Explosives, C-4 (RDX)
  - M83 Butterfly Bombs (very dangerous) TNT

XREF Files: IMAGE Files: airplane.jpg
File: O:\116188-FUDS-CAD\0300030\Rev-A\030003A02.dwg Layout: Layout1 User: Michael.Crawford Jul 11, 2006 - 11:11am

OFFICE	DRAWN BY		DRAWING NUMBER	030003A02
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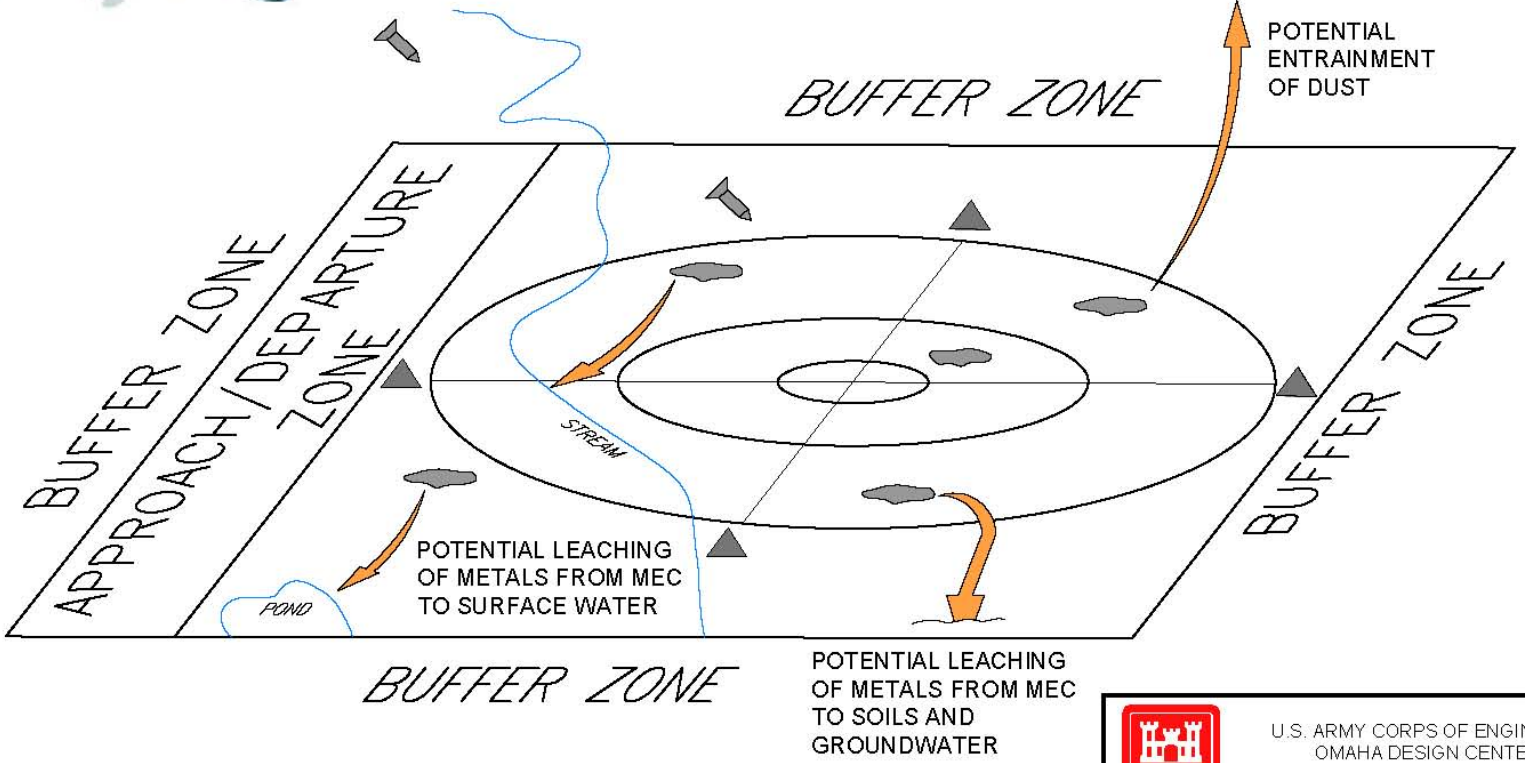


U.S. ARMY CORPS OF ENGINEERS
OMAHA DESIGN CENTER

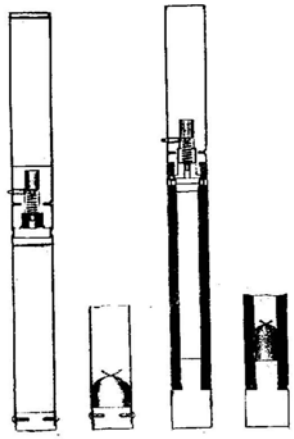
FIGURE 3

CONCEPTUAL SITE MODEL
PRECISION BOMBING RANGE

BOARDMAN AIR FORCE RANGE

Shaw® Shaw Environmental, Inc.

BOMB, INCENDIARY, M50

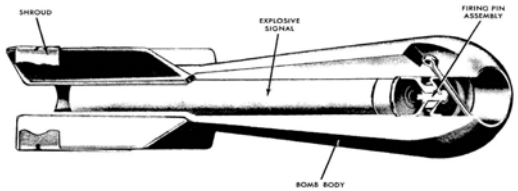


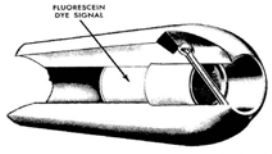
General. Principally used against buildings of frame construction, in conjunction with the use of demolition bombs. These bombs are normally unpainted metal but may be painted a light green to prevent oxidation during storage. A purple band around center of the body denotes incendiary nature of bomb. Nose of bomb is stamped with designation and manufacturer's markings. Fuze tail mechanical impact, no designation.

Over-all length ..... 21.35 inches
Diameter ..... 1.7 inches
Weight ..... 4 pounds
Filler ..... Thermite

Reference: TM 9-1984, *Disposal of American and Allied Bombs and Fuses*, Nov 1942

MINIATURE PRACTICE BOMBS
AN-Mk 5 Mod 1, AN-Mk 23, AN-Mk 43



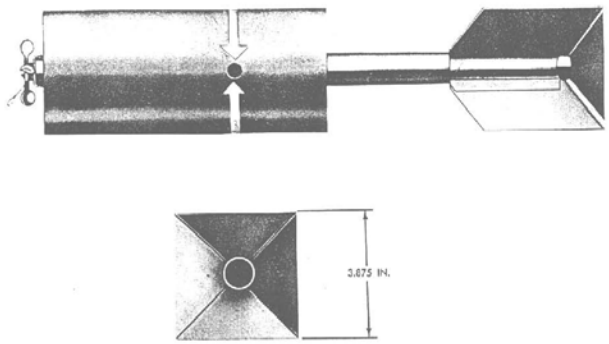


Description. These bombs are used for low-altitude horizontal, or dive-bombing practice. The three bombs are similar in physical appearance, but differ basically in the metal used to cast the body. Bombs are used with the AN-Mk 4 practice bomb signal that is a blank 10-gauge shotgun shell (extended length). Signals contain a black powder expelling charge and a red phosphorous pyrotechnic mixture. These bombs also are used with the MK5 signal that contains a fluorescein dye and is actuated by impact on water. When the Mk5 signal is installed, the firing pin assembly is not used.

Over-all length	8.25 inches
Body Diameter	2.18 inches
Fin Dimension	2.5 inches
Weight	AN-Mk 5 Mod 1 - 2 lb. 11 oz. $\pm$ 1 oz AN-Mk 23 -3 lb. $\pm$ 2 oz AN-Mk 43 - 4 lb. 7 oz. $\pm$ 2 oz.
Signal	AN-Mk 4, Black powder/pyro-Technic charge Mk 5, Fluorescein dye

Reference: OP 1280, *Aircraft Bombs*, February 1945; TM 9-1325-200, *Bombs and Bomb Components*, April 1966

BOMB, PRACTICE, 5-LBS, MK 106 MOD 0

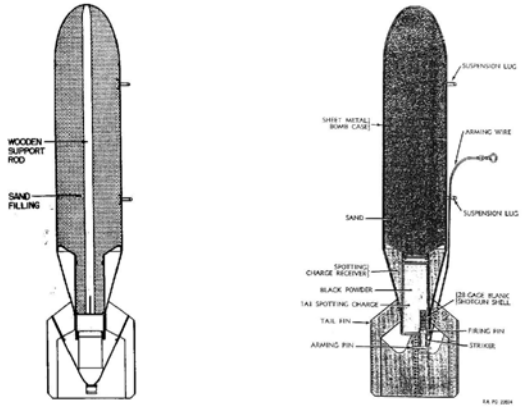


Description. Practice bomb MK106 Mod 0 is a thin-cased, cylindrical bomb. It is composed of a bomb body assembly, a practice bomb signal MK4 mod 3, and a modified fuze assembly M173. The bomb is composed of an inner cylinder, and outer cylinder, and a fin assembly. The bomb is designed for low altitude drops. Modified fuze assembly M173, consisting of an adapter and the fuze M173 less booster, is installed in the nose of the bomb. The fuze is fully armed by anemometer vanes after completing 220 feet of air travel. When the bomb impacts with the target, the fuze functions and causes instantaneous detonation of the signal, MK4 Mod 3. Smoke produced from the detonated signal is discharged rearward through an inner cylinder in the bomb body.

Over-all length .....18.75 inches
Body Diameter .....3.875 inches
Weight.....4.56 pounds
Signal .....MK4 Mod 3
Filler .....Smokeless powder/stabilized red phosphorus
Fuze .....M173 modified

Reference: TM 9-1325-200, *Bombs and Bomb Components*, April 1966

BOMB, PRACTICE, 100 POUND, M38A2



with M5 spotting charge **with M1A1 spotting charge**

Description. This bomb simulates a General Purpose bomb of the same size. It is constructed of light sheet metal, approximately 22 gage, formed by rolling a rectangular sheet of metal into the form of a cylinder approximately 8 inches in diameter, and spot-welding the seam. The rounded nose is pressed from the same metal, as is the tail, which is formed in the shape of a cone. The tail portion ends in box type fins, which is welded to the cone. Inside of the smaller end of the conical tail section is welded the spotting charge receiver. The spotting charge is assembled in a sleeve at the base of the bomb, within the fin box. Authorized spotting charges are the M1A1, M3, and M5. When using the M5 spotting charge a wooden support rod is installed in the bomb. Two suspension lugs are bolted to the bomb body during fabrication. The Suspension Band M1 is provided for single suspension. The band is a separate component. The over-all length of the bomb body is 472 inches. When empty, the bomb body weighs approximately 14 pounds. When completely loaded with sand and spotting charge, the weight of the bomb is approximately 100 pounds.

Over-all length.....47.5 inches
Diameter.....8.13 inches
Weight empty.....15.7 pounds
Weight sand loaded & spotting charge.....100 pounds

Reference: TM 9-1904, *Ammunition Inspection Guide*, March 1944; NAVSEA OP 1664 Volume 2, *U.S. Explosive Ordnance*, February 1954; *Complete Round Chart #5981*, October 1944

BOMB (BUTTERFLY) AMIDSHIPS FUZE M129

Characteristics

Action—Impact or aerial burst.*
Modifications—None.
Status—Service.
Restriction on Use—None.
Air Travel to Arm—After release from the cluster, approximately 50 ft. of air travel are required to activate the clockwork mechanism.
Indication of Arming—If the arming spindle is unthreaded more than ⅛ inch, the fuze should be considered armed.

*All fuzes preset by manufacturer for action upon impact—aerial burst feature not used by Navy.

Bomb in Which Used

Four-lb. Fragmentation (Butterfly) Bomb M8
Note—Fuzes M129 are installed in the bomb an all settings are made at the factory. No attemp should ever be made to remove the fuzes, chang the settings, or work on the fuzes in any way.

Figure 64.—Fragmentation (Butterfly) Bomb M83, Side View, Open, Showing Location of Amidships Fuze

Boardman Air Force Range

- Conceptual Site Model
  - Current & Future Land Use:
    - Grazing, farming, power production, natural area
  - Potential Contaminant Sources:
    - Practice Bombs
    - Incendiary bombs
    - Demolition explosives (C-4)
    - Fuzes
    - M83 butterfly bombs

Boardman Air Force Range

- Conceptual Site Model (continued)
  - MEC Evaluation/Pathways:
    - Undetonated bombs (signal charge or HE), Incomplete ordnance destruction
      - Surface exposure
      - Subsurface exposure
    - MEC known on Targets 2, Carty Reservoir, INPR No. 1, Demo Areas
    - MEC survey needed at Target No. 1

Boardman Air Force Range

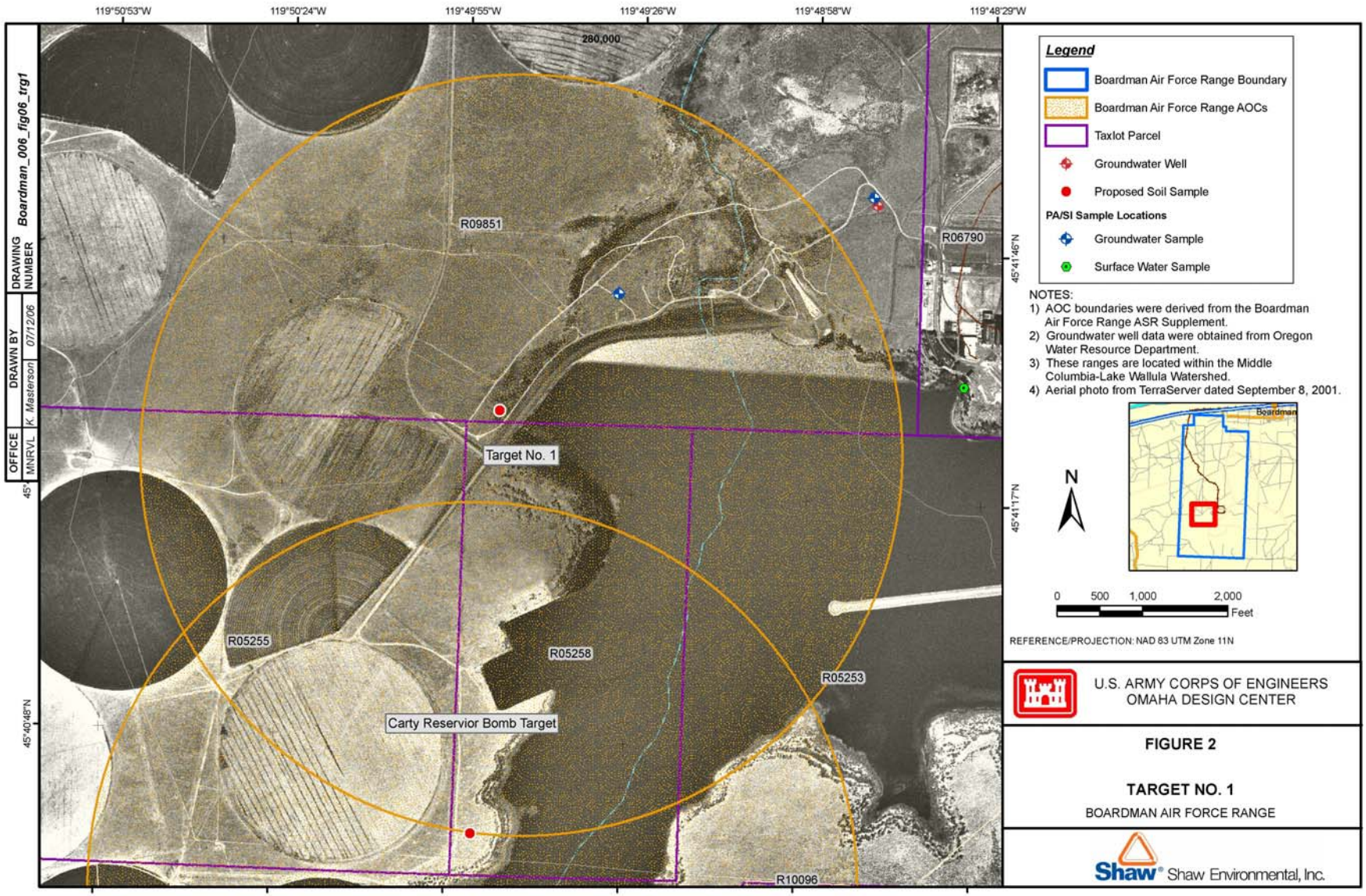
- Conceptual Site Model (continued)
  - MC Evaluation/Types:
    - Metals (Bomb debris)
      - Lead and steel (Al, Sb, Ba, Cd, Cr, Co, Cu, Fe, Pb, Mn, Mg, Mo, Hg, Ni, Ti, Zn)
    - Explosives
      - Black powder (potassium nitrate, sulfur, charcoal)
      - Nitrocellulose
      - Nitroglycerin
      - TNT, RDX, PETN
    - Tracers

Boardman Air Force Range

- Conceptual Site Model (continued)
  - MC Pathways
    - Soil (potentially affected)
    - Surface Water (potentially affected)
      - Sixmile Canyon Creek
      - Carty Reservoir
    - Sediment (potentially affected)
    - Groundwater (potentially affected)
    - Air (potentially affected)

Boardman Air Force Range

- Proposed Field Investigation
  - Target No. 1
    - Visual and magnetometer reconnaissance for MEC
    - One soil sample if munitions or munitions debris is located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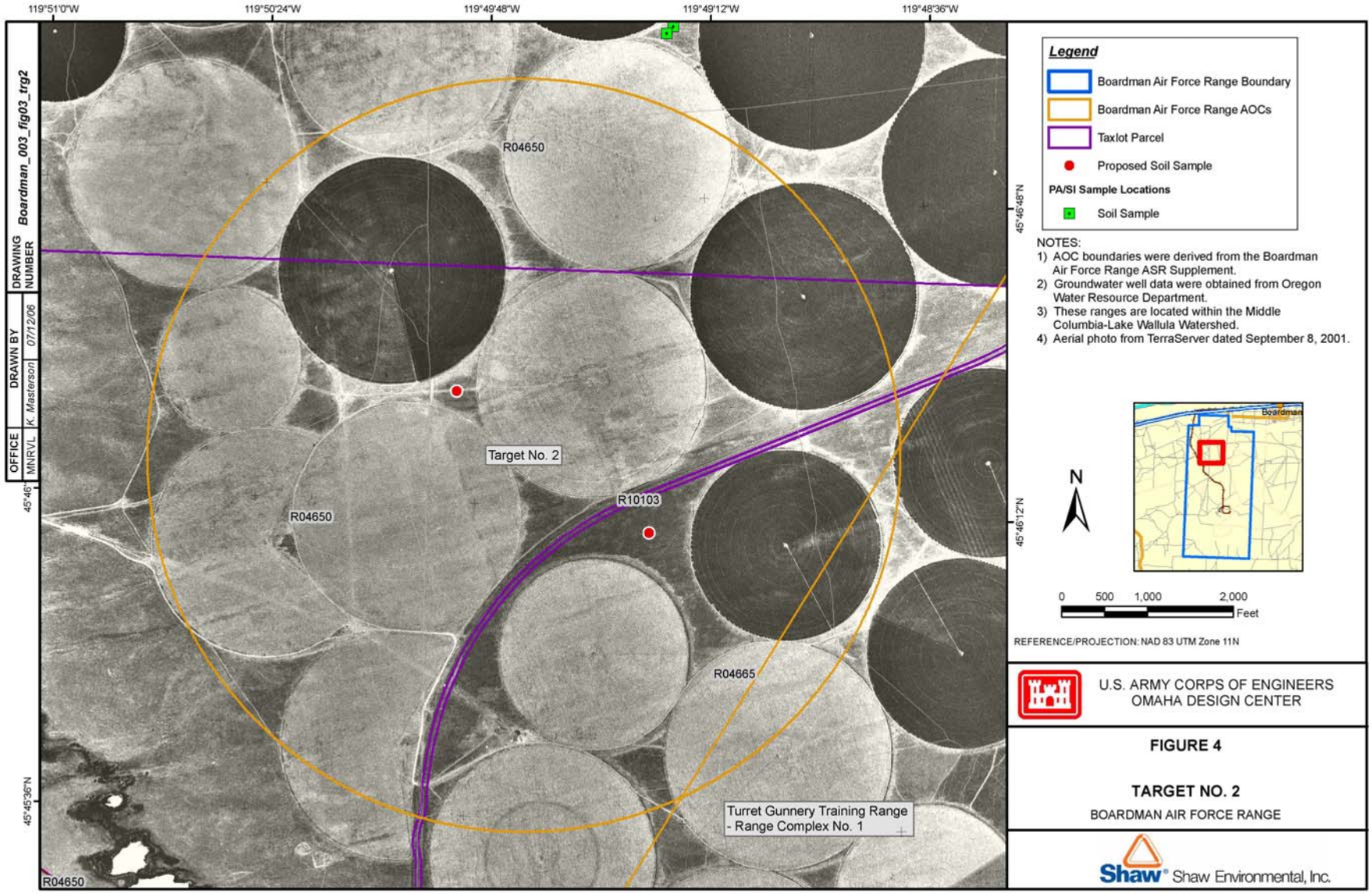
119°48'58"W
119°48'29"W
280,000
45°41'46"N
45°41'17"N
45°40'48"N
R09851
R06790
Target No. 1
R05255
R05258
R05253
Carty Reservior Bomb Target
R10096
OFFICE MNRVL
DRAWN BY K. Masterson 07/12/06
DRAWING NUMBER Boardman_006_fig06_trg1
Legend
Boardman Air Force Range Boundary
Boardman Air Force Range AOCs
Taxlot Parcel
Groundwater Well
Proposed Soil Sample
PA/SI Sample Locations
Groundwater Sample
Surface Water Sample
NOTES:
1) AOC boundaries were derived from the Boardman Air Force Range ASR Supplement.
2) Groundwater well data were obtained from Oregon Water Resource Department.
3) These ranges are located within the Middle Columbia-Lake Wallula Watershed.
4) Aerial photo from TerraServer dated September 8, 2001.
Boardman
N
0 500 1,000 2,000
Feet
REFERENCE/PROJECTION: NAD 83 UTM Zone 11N
U.S. ARMY CORPS OF ENGINEERS
OMAHA DESIGN CENTER
FIGURE 2
TARGET NO. 1
BOARDMAN AIR FORCE RANGE
Shaw Shaw Environmental, Inc.

Boardman Air Force Range

- Proposed Field Investigation
  - Target No. 2
    - No visual and magnetometer reconnaissance for MEC – already known to be present
    - Two soil samples - analyzed for metals and explosives
    - Sediment and surface water sampled during PA/SI
    - Groundwater sampled FUDS wide in PA/SI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119°50'24"W
119°49'48"W
119°49'12"W
119°48'36"W
45°46'48"N
45°46'12"N
45°45'36"N
R04650
Target No. 2
R10103
R04650
R04665
Turret Gunnery Training Range
- Range Complex No. 1
R04650
DRAWING NUMBER
Boardman_003_fig03_trg2
DRAWN BY
K. Masterson
07/12/06
OFFICE
MNRVL
Legend
Boardman Air Force Range Boundary
Boardman Air Force Range AOCs
Taxlot Parcel
Proposed Soil Sample
PA/SI Sample Locations
Soil Sample
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Boardman
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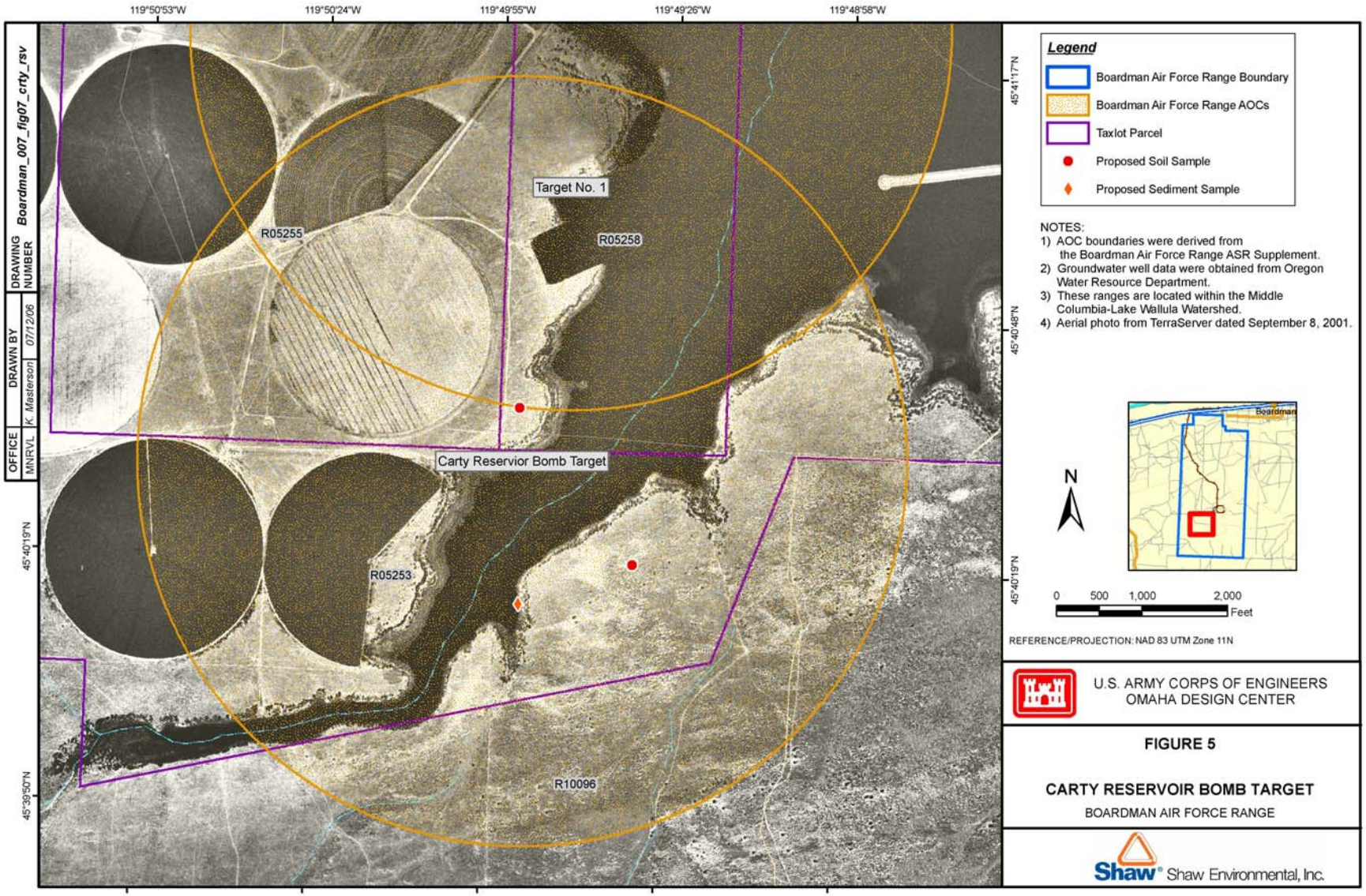
Feet
REFERENCE/PROJECTION: NAD 83 UTM Zone 11N
U.S. ARMY CORPS OF ENGINEERS
OMAHA DESIGN CENTER
FIGURE 4
TARGET NO. 2
BOARDMAN AIR FORCE RANGE
Shaw Shaw Environmental, Inc.

Boardman Air Force Range

- Proposed Field Investigation
  - Carty Reservoir Bomb Target
    - No visual and magnetometer reconnaissance for MEC – already known to be present
    - Two soil samples - analyzed for metals and explosives
    - One sediment sample - metals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119°49'55"W
119°49'26"W
119°48'58"W
45°41'17"N
45°40'48"N
45°40'19"N
45°39'50"N
Target No. 1
R05255
R05258
Carty Reservior Bomb Target
R05253
R10096
OFFICE MNRVL
DRAWN BY K. Masterson 07/12/06
DRAWING NUMBER Boardman_007_fig07_crty_rsv
Legend
Boardman Air Force Range Boundary
Boardman Air Force Range AOCs
Taxlot Parcel
Proposed Soil Sample
Proposed Sediment Sample
NOTES:
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3) These ranges are located within the Middle Columbia-Lake Wallula Watershed.
4) Aerial photo from TerraServer dated September 8, 2001.
Boardman
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0 500 1,000 2,000
Feet
REFERENCE/PROJECTION: NAD 83 UTM Zone 11N
U.S. ARMY CORPS OF ENGINEERS
OMAHA DESIGN CENTER
FIGURE 5
CARTY RESERVOIR BOMB TARGET
BOARDMAN AIR FORCE RANGE
Shaw Shaw Environmental, Inc.

Boardman Air Force Range

- Proposed Field Investigation
  - Range Complex No. 1
    - No visual and magnetometer reconnaissance for MEC – already known to be present
    - 2 soil samples collected from INPR Site No. 1 in PA/SI
    - Two soil samples to be collected from Demo Area – analyzed for metals and explosives.
    - No sampling at Turret Gunnery Training Range

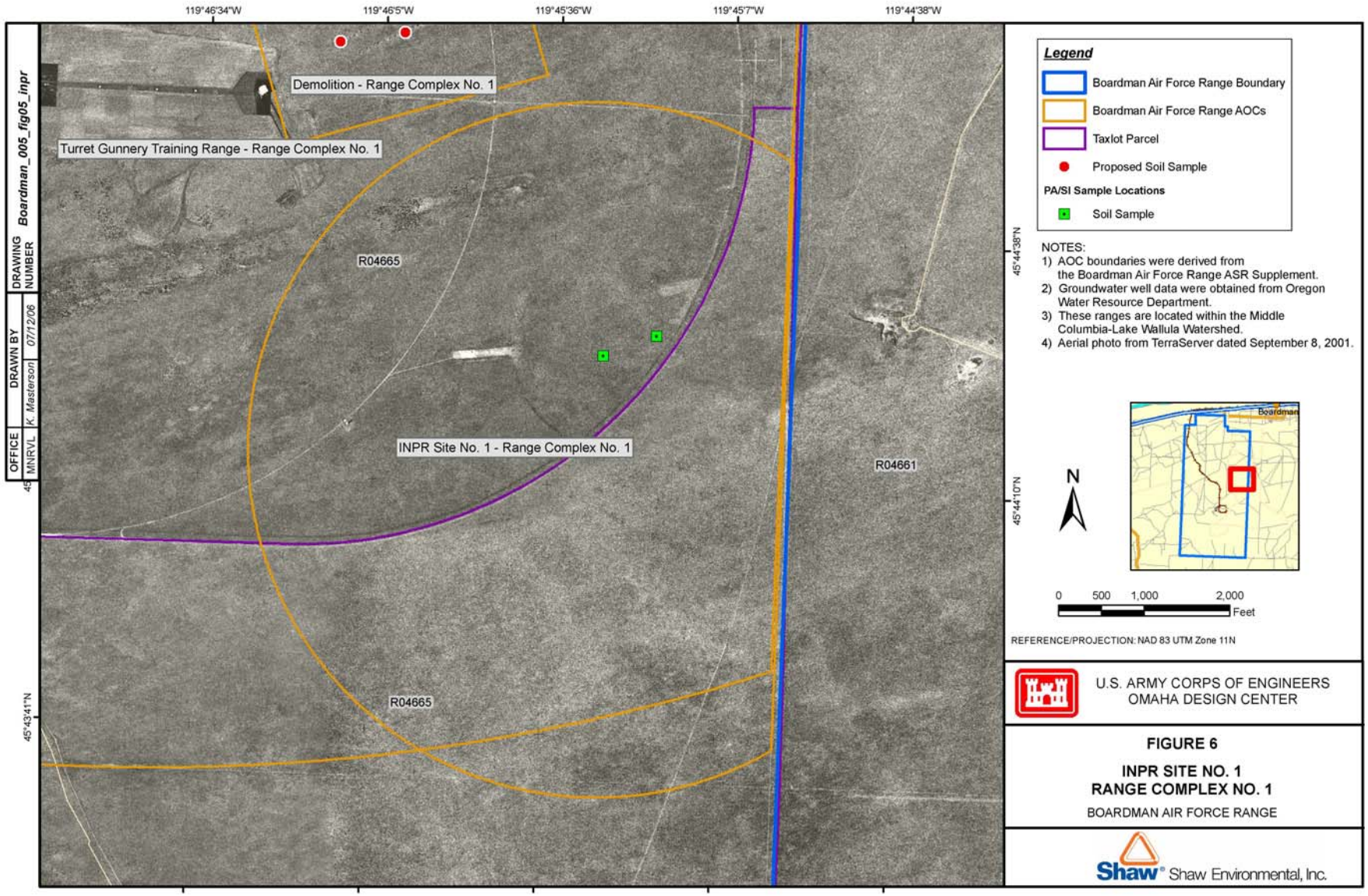

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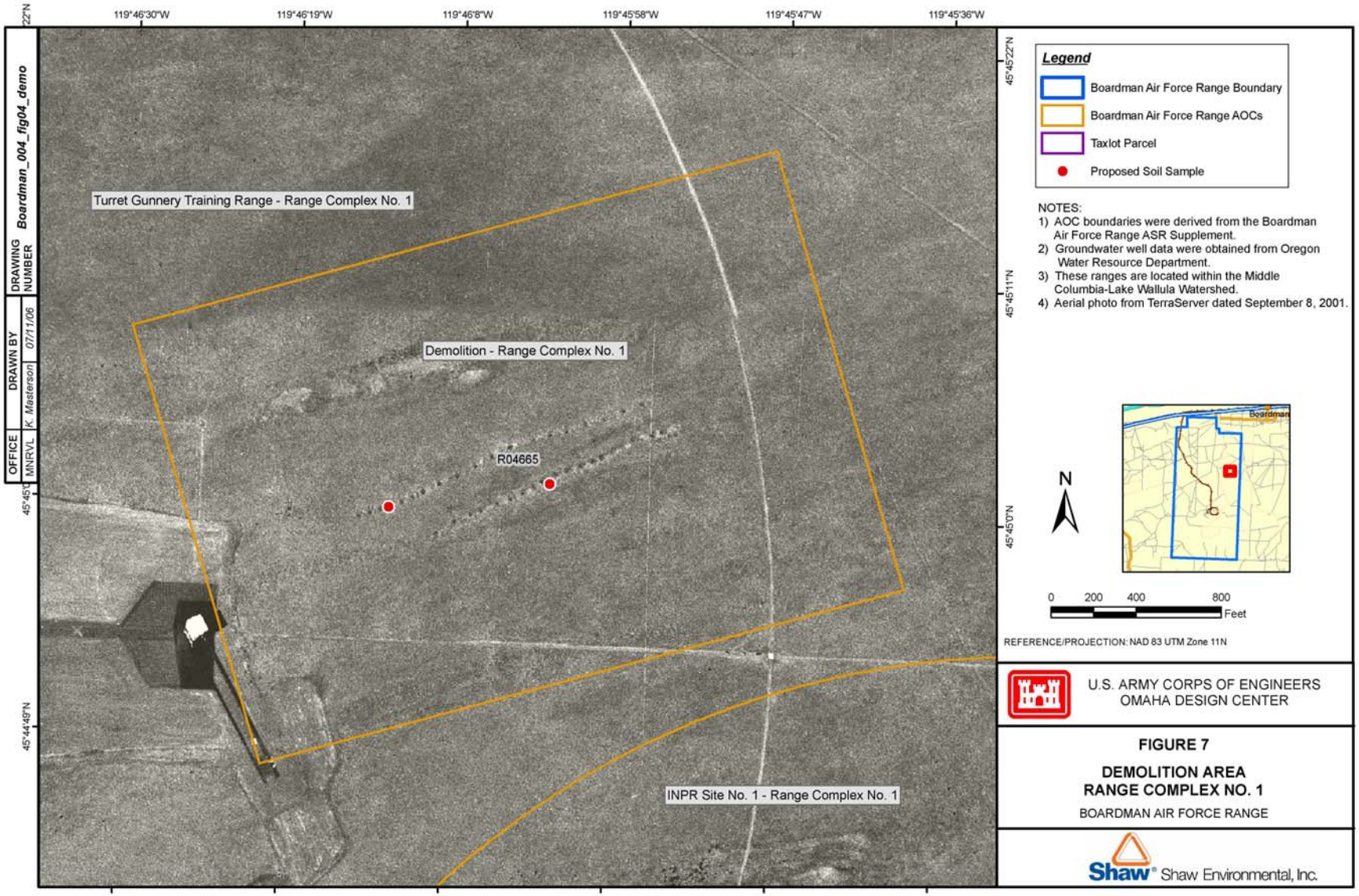
FIGURE 6

INPR SITE NO. 1
RANGE COMPLEX NO. 1

BOARDMAN AIR FORCE RANGE

Shaw® Shaw Environmental, Inc.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119°46'19"W
119°46'8"W
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119°45'47"W
119°45'36"W
45°45'22"N
45°45'11"N
45°45'0"N
45°44'49"N
Turret Gunnery Training Range - Range Complex No. 1
Demolition - Range Complex No. 1
R04665
INPR Site No. 1 - Range Complex No. 1
OFFICE MNRVL
DRAWN BY K. Masterson 07/11/06
DRAWING NUMBER Boardman_004_fig04_demo
Legend
Boardman Air Force Range Boundary
Boardman Air Force Range AOCs
Taxlot Parcel
Proposed Soil Sample
NOTES:
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Boardman
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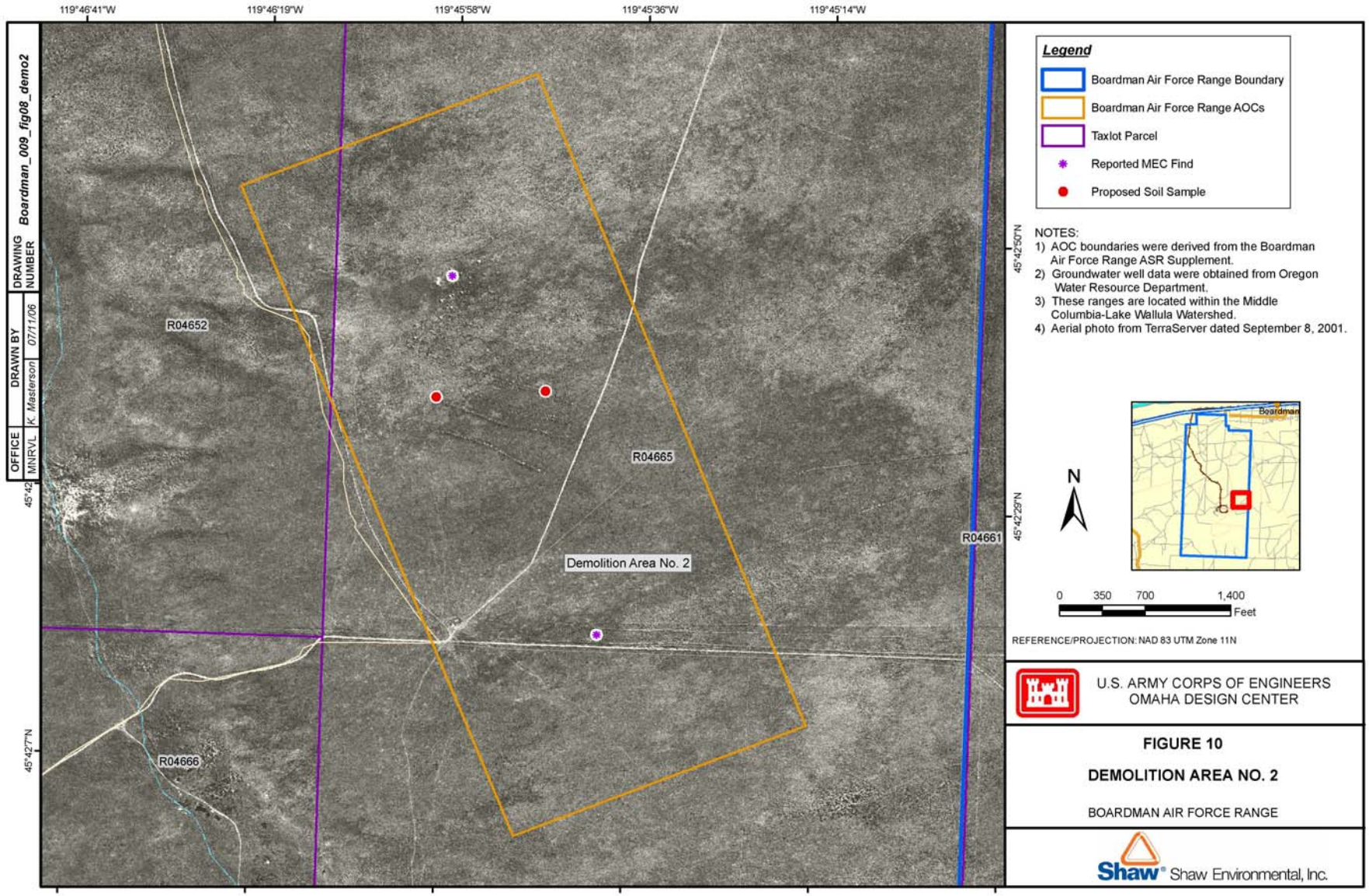
Feet
REFERENCE/PROJECTION: NAD 83 UTM Zone 11N
U.S. ARMY CORPS OF ENGINEERS
OMAHA DESIGN CENTER
FIGURE 7
DEMOLITION AREA
RANGE COMPLEX NO. 1
BOARDMAN AIR FORCE RANGE
Shaw Shaw Environmental, Inc.

Boardman Air Force Range

- Proposed Field Investigation
  - Demolition Area No. 2
    - No visual and magnetometer reconnaissance for MEC – already known to be present
    - No previous sampling
    - Two soil samples to be collected from Demo Area No 2 – analyzed for metals and explosives.
    - No sediment, surface water, or groundwater sampling
    - Groundwater sampled FUDS wide in PA/SI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119°46'19"W
119°45'58"W
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119°45'14"W
45°42'50"N
45°42'29"N
45°42'7"N
R04652
R04665
R04661
R04666
Demolition Area No. 2
OFFICE MNRVL
DRAWN BY K. Masterson 07/11/06
DRAWING NUMBER Boardman_009_fig08_demo2
Legend
Boardman Air Force Range Boundary
Boardman Air Force Range AOCs
Taxlot Parcel
Reported MEC Find
Proposed Soil Sample
NOTES:
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N
Boardman
0 350 700 1,400
Feet
REFERENCE/PROJECTION: NAD 83 UTM Zone 11N
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OMAHA DESIGN CENTER
FIGURE 10
DEMOLITION AREA NO. 2
BOARDMAN AIR FORCE RANGE
Shaw Shaw Environmental, Inc.

Central Oregon Gunnery Range

- Proposed Field Investigation (continued)
  - Background Sampling
    - 10 soil samples from outside of AOC but within Boardman Air Force Range boundary
    - Analyzed for metals only

Avoid Munitions/Munitions Debris:

- It is conceivable that some munitions on the ranges are still “LIVE”
  - Even old munitions if incorrectly handled can maim or kill!
  - Don’t touch or move
  - Contact OSP or Local Law Enforcement if suspicious item is found
    - OSP 1-800-452-7888

Questions and Comments